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**Re: Daniel Rodrigues**

Daniel Rodrigues joined ICIS as a summer intern in June and July 2021. He was working on a project under my supervision, focusing on web analytics. The internship was a great success: We were able to make substantial progress on the project thanks to the work that Daniel put in.

The *Product Success Score*, or *PSS*, is a web-based survey measuring customer satisfaction with ICIS web services. By combining the PSS results with logs of web activity associated with user sessions, it is possible to gain insights into how various web services are performing, where weak points are etc. By analysing the user activity alone, without PSS score, we can learn how users are interacting with our websites.

During the internship project, Daniel worked on the following areas;

- Preparing the labelled web usage data for use in modelling algorithms. Aggregating various labels and common sub-sequences within user sessions.
- Modelling the PSS-labelled web usage data to predict PSS success or failure for a session. Assessing the results and improving the models.
- Preparing non-aggregated full session data for use with an LSTM neural network model, and building and testing such models
- Researching similarity measures for clustering whole-session data
- Building a k-prototypes clustering code to cluster unlabelled session data
- Visualizing sessions and web usage sequences using a dashboard.

The main tools used for this work were python in jupyter notebooks, pandas, scikit-learn, keras plus tensorflow, and for the dashboards, dash cytoscape.

Throughout the internship, I found Daniel to be hardworking, and both eager and quick to learn new techniques and tools. He had a great aptitude for coding at the beginning, and his coding skills improved throughout, while his knowledge of machine learning improved to the level where he was building and testing advanced recurrent neural networks and a custom written 'k-prototypes' clustering algorithm for whole web sessions based on Levenshtein distances. He was able to work independently from the start, by the end needing only high level guidance and quickly reaching a collaborative level of coworking. He was able to apply his initiative to tasks to keep them moving when setbacks occurred. During the internship, he took a full part in group meetings, and on one occasion presented his part of the ongoing work in a discussion with senior management. He also made a presentation of his work to the wider group at the end of the internship which was very well received.

In short, I would not hesitate to recommend Daniel very highly for any position he may seek in the future.

